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Indian Standard

GLOSSARY OF TERMS RELATING TO TILLAGE AND INTERCULTIVATION EQUIPMENT

PART II TERMS RELATING TO EQUIPMENT

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GLOSSARY OF TERMS RELATING TO TILLAGE AND INTERCULTIVATION EQUIPMENT

PART II TERMS RELATING TO EQUIPMENT

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GLOSSARY OF TERMS RELATING TO TILLAGE AND INTERCULTIVATION EQUIPMENT

PART II TERMS RELATING TO EQUIPMENT

0. FOREWORD

0.1 This Indian Standard (Part II) was adopted by the Indian Standards Institution on 29 June 1981, after the draft finalized by the Soil Working Equipment Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 With increasing scope of farm mechanization, a large number of tillage and intercultivation equipment are being designed, developed, manufactured and used in the country. The need was, therefore, felt for a comprehensive glossary which would provide authentic definitions of the terms used in respect of such equipment. It is hoped that this glossary would serve as a useful reference.

0.3 This standard is being published in two parts. This part covers the definitions relating to equipment. Part I covers the definitions of general terms.

0.4 In preparation of this standard, assistance has been derived from the following:

ISO/TC 23/SC 1 N 57 (ISO DP 3339/III) Agricultural and forestry tractors and machinery classification terminology: Part III Equipment for Working the Soil. International Organization for Standardization.

BS 2468: 1963 Glossary of terms relating to agricultural machinery and implements. British Standards Institution.

1. SCOPE

1.1 This Standard (Part II) covers the definition of terms relating to equipment for primary tillage, secondary tillage and intercultivation operations.

2. PRIMARY TILLAGE EQUIPMENT

2.1 Plough — An implement used to cut the furrow slice with partial or complete soil inversion and in some cases to break it (*see* Fig. 1).

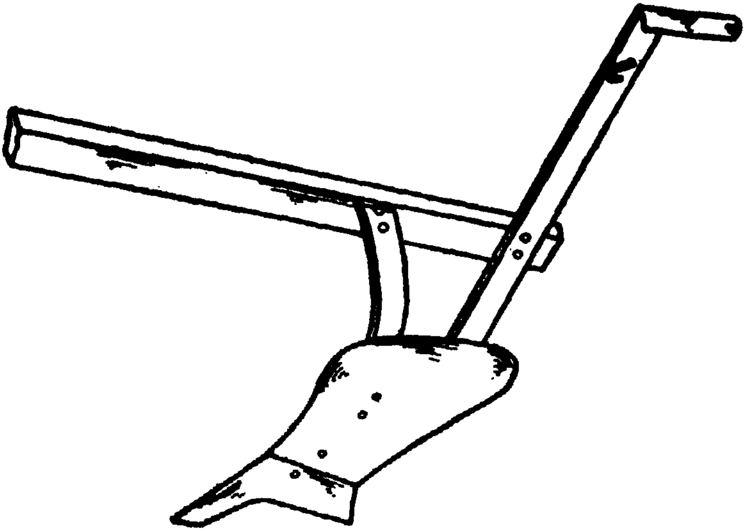


FIG. 1

2.1.1 *Types of Ploughs*

2.1.1.1 *Alternate plough* — A plough having an even number of bodies turning to right and left respectively and mounted side by side, which can be raised or lowered separately turning about a transverse axis (*see* Fig. 2).

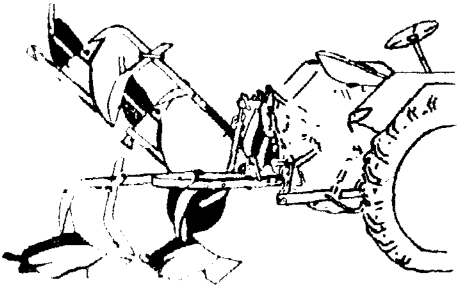


FIG. 2

2.1.1.2 *Balance plough* — A plough with bodies mounted facing one another on beams or frames which are situated on opposite sides of transverse axis and are joined together at an obtuse angle. The plough is not turned at the ends of the field, but are partially rotated about the axis and works to and fro with right and left bodies alternately in work (*see* Fig. 3).

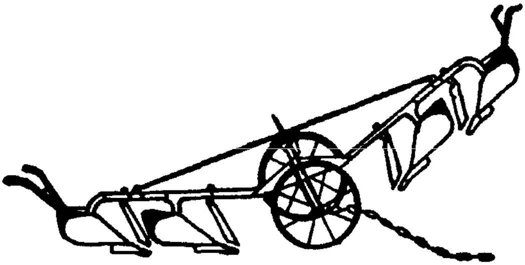


FIG. 3

2.1.1.3 *Chisel plough* — A plough used to cut through hard soils by means of one or a number of narrow tines.

2.1.1.4 *Disc plough* — A plough the working parts of which are concave or trancated cone discs which act simultaneously as mould board and share (*see* Fig. 4).

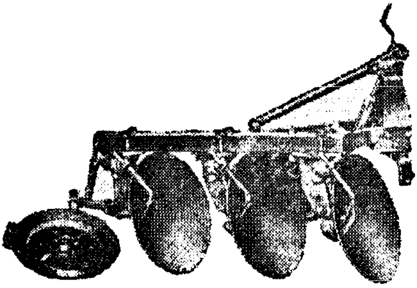


FIG. 4

2.1.1.5 *Framed plough* — A plough the body (or bodies) of which are attached to a framed beam.

2.1.1.6 *Gallows plough* — An animal-drawn plough, the end of the beam rests freely on a bolster fixed to two front wheels, which is drawn through the front wheel assembly (*see* Fig. 5).

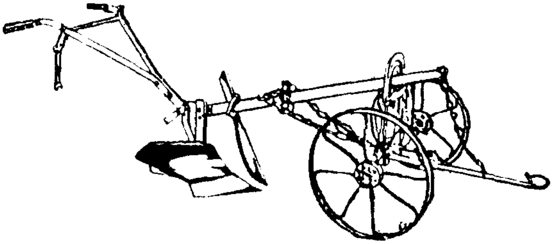


FIG. 5

2.1.1.7 *Gang plough* — A riding plough with two or more bottoms.

2.1.1.8 *Lister plough* — A mouldboard plough with double mouldboards for throwing the soil in opposite directions.

2.1.1.9 *Mouldboard plough* — A plough with share and mouldboard which cuts furrow slice, lifts and inverts it.

2.1.1.10 *Off-set plough* — A plough with off-set beam to work borders and headland.

2.1.1.11 *One-way plough* — A plough which turns the furrow slice in the same direction with respect to the forward travel (*see* Fig. 6).

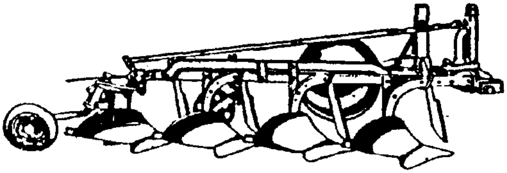


FIG. 6

2.1.1.12 *Pore hal* — A narrow wooden plough with sowing attachment.

2.1.1.13 *Reversible plough* — A plough which turns the furrow slice to the right and to the left alternatively with respect to the forward travel.

a) *Reversible plough, half-turn type* — A plough with bottoms (bodies) mounted on opposite sides of a beam or frame which can be rotated approximately 180° about a longitudinal axis (*see* Fig. 7).

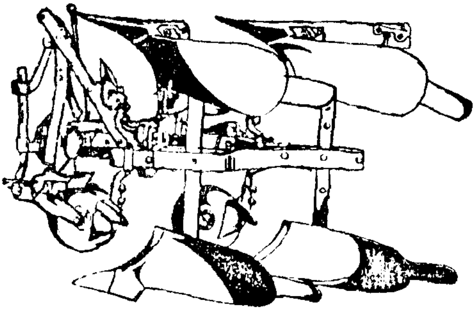


FIG. 7

b) *Reversible plough, roll-over type* — A plough of which the right and left bottoms (bodies) are on opposite sides of a transverse axis, perpendicular to the direction of travel, about which they can turn 180° (*see* Fig. 8).

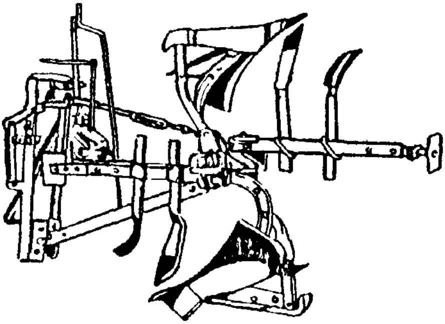


FIG. 8

c) *Reversible plough, turnwrest type* — A plough in which a compound body is turned from the right to the left hand by rotating it through approximately 180° about a longitudinal axis (*see* Fig. 9).

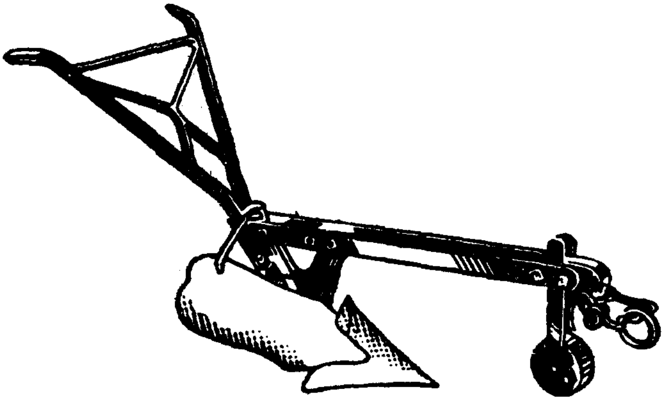


FIG. 9

d) *Reversible plough, quarter-turn type* — A plough of which the bottoms (bodies) mounted on the same beam are fixed at an angle of 90° to each other and able to pivot through a quarter circle about the longitudinal axis (*see* Fig. 10).

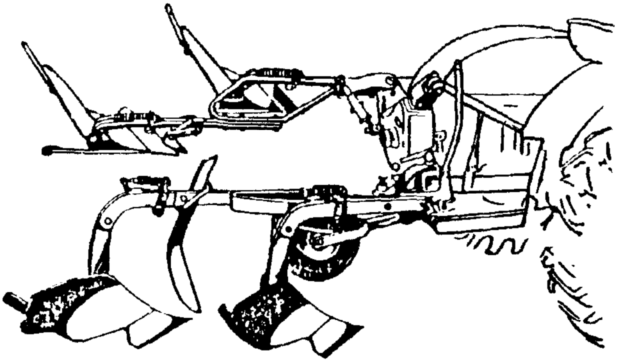


FIG. 10

2.1.1.14 *Riding plough* — A plough balanced on wheels and on which the operator rides during the operation.

2.1.1.15 *Rotary plough* — A plough used to cut and to pulverize soil by impact forces by means of a number of rotating tines or knives which are mounted on a horizontal rotar.

2.1.1.16 *Rotating auger plough* (*combinous*) — A plough with short plough bottom followed with vertical rotars having blades (*see* Fig. 11).

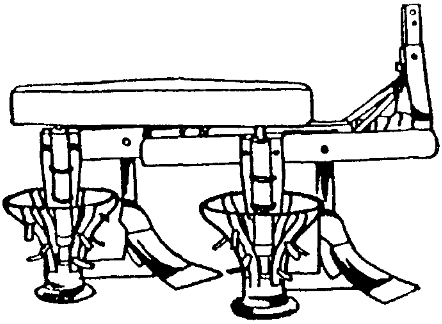


FIG. 11

2.1.1.17 *Stubble plough* — A plough specially designed to turn over and bury stubble (*see* Fig. 12).

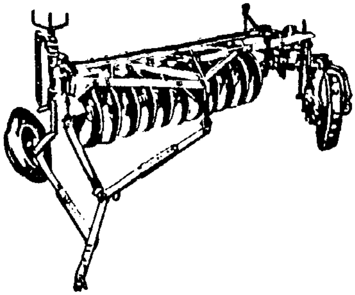


FIG. 12

2.1.1.18 *Stump-jump plough* — A plough with spring-loaded plough bottom or discs which rides over stumps and other obstructions in the soil (*see* Fig. 13).

2.1.1.19 *Subsoiler* — A plough designed to penetrate the soil to depths more than those achieved during normal ploughing operation, usually 40 cm or more.

2.1.1.20 *Sulky plough* — A single bottom riding plough.

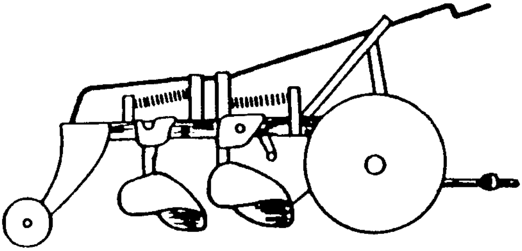


FIG. 13

2.1.1.21 *Swing plough* — An animal-drawn plough without supporting wheel whose stability is ensured by the handles, the depth and width of work being regulated by using a draft adjustment (*see* Fig. 14).

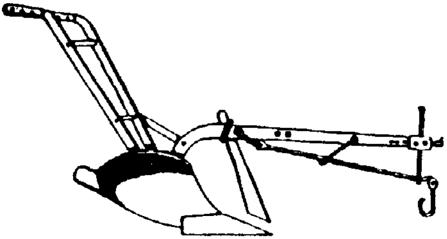


FIG. 14

a) *Double-wheel plough* — A swing plough with a land and a furrow wheel mounted on vertical standards on a crossbar (*see* Fig. 15).

b) *Single-wheel plough* — A swing plough provided with a wheel or a toe at the front (*see* Fig. 16).

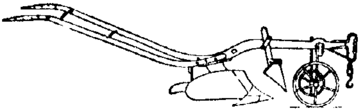


FIG. 15

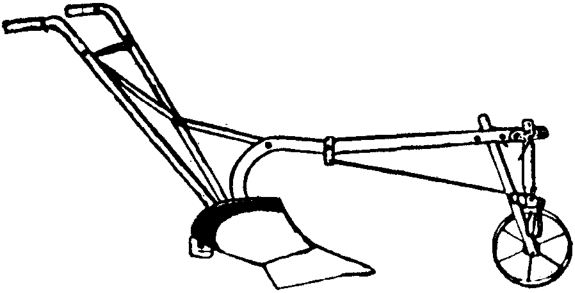


FIG. 16

2.1.1.22 *Trip beam plough* — A plough with a latch or trip mechanism which permits the body to swing back to ride over an obstruction.

2.1.1.23 *Vertical disc plough* — A plough which combines the principles of the disc plough and the disc harrow and used for shallow working in soil (*see* Fig. 17).

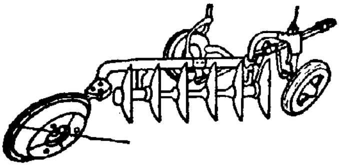


FIG. 17

2.1.1.24 *Vineyard plough* — A plough specially designed to perform not only ploughing operation but also the earthing up and similar operations in vineyards (*see* Fig. 18).

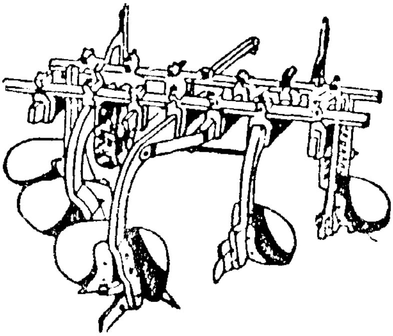


FIG. 18

2.1.1.25 *Walking plough* — A plough in which balancing and controlling is done by the operator while walking behind it.

2.1.1.26 *Winch plough* — A plough having two wheels of unequal diameter permitting intermittent ploughing, the paths of work being in the direction of winch (*see* Fig. 19).

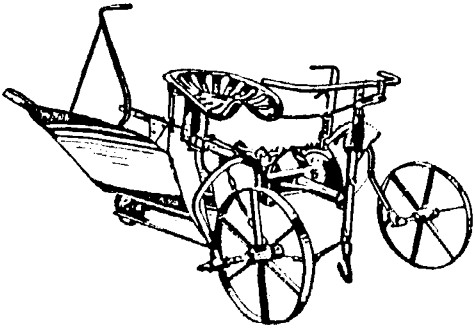


Fig. 19

2.1.1.27 *Wooden plough* — An indigenous implement made mainly of wood and used for cutting and breaking the soil with bar like share (*see* Fig. 20). It is a also known as *deshi* plough.

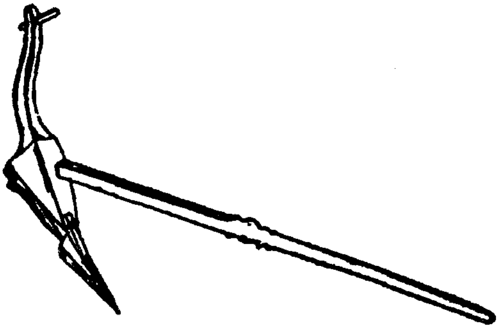


FIG. 20

2.1.2 *Disc Plough Details*

2.1.2.1 *Concavity* — The depth measured at the lowest point at the centre of the disc by placing its concave side on a flat surface.

2.1.2.2 *Disc* — A circular, concave and revolving steel plate used for cutting and inverting the soil.

2.1.2.3 *Disc angle* — The angle at which the plane of the cutting edge of the disc is inclined to the direction of travel (*see* Fig. 21).

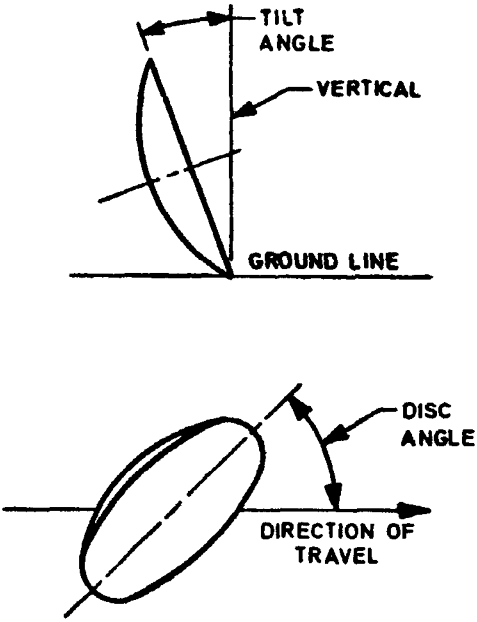


FIG. 21

2.1.2.4 *Eccentricity* — The radial deviation of points on the disc edge in a plane perpendicular to the axis of the disc when the disc is rotated about its centre.

2.1.2.5 *Scraper* — A device to remove soil that tends to stick to the working surface of a disc.

2.1.2.6 *Tilt angle* — The angle at which the plane of the cutting edge of the disc is inclined to a vertical line (*see* Fig. 21).

2.1.2.7 *Wobble* — The axial deviation of points on the disc edge in a plane parallel to the axis of the disc when the disc is rotated about its centre.

2.1.3 *Mouldboard Plough Details*

2.1.3.1 *Plough bottom* (*body*) — An assembly comprising the frog, standard (leg), mouldboard, share and land side (*see* Fig. 22).

2.1.3.2 *Frog* — The part to which other components of the plough bottom are attached (*see* Fig. 22).

2.1.3.3 *Land side* — The flat plate which bears against and transmits the rear side lateral thrust of the plough bottom to the furrow wall (*see* Fig. 22).

2.1.3.4 *Heel of land side* — The rear underside of the land side which slides along the furrow sole (*see* Fig. 22).

2.1.3.5 *Replaceable heel* — A heel of the land side which is replaceable.

2.1.3.6 *Edge clearance* — The maximum clearance between the cutting edge of share and straight line touching the point of share and wing of share (*see* Fig. 22).

2.1.3.7 *Wing bearing* — The level portion of the wing of the share providing a bearing for the outer corner of the plough bottom (*see* Fig. 22).

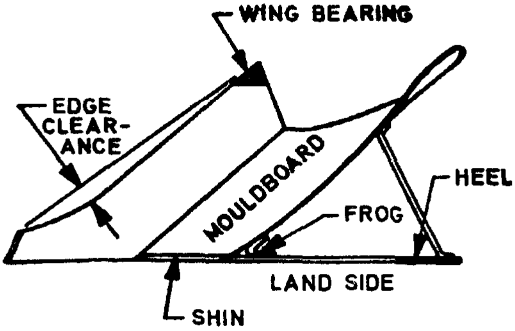


FIG. 22

2.1.3.8 *Tail piece* — An adjustable extension which can be fastened to the rear of a mouldboard to help in turning or comprising a furrow slice (*see* Fig. 23).

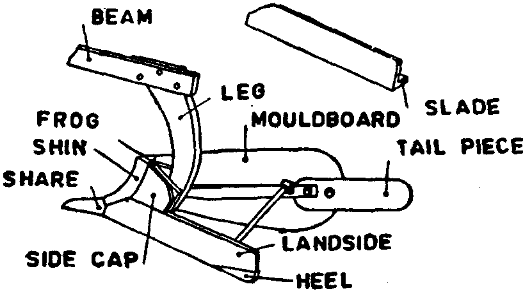


FIG. 23

2.1.3.9 *Knife tail piece* — A tail piece to cut a furrow slice.

2.1.3.10 *Side cap* — A plate fitted above a land side (*see* Fig. 23).

2.1.3.11 *Slade* — A horizontal plate bearing on a furrow bottom, usually integral with a land side (*see* Fig. 23).

2.1.3.12 *Mouldboard* — The curved part which lifts and turns the furrow slice (*see* Fig. 23).

2.1.3.13 *Shin of mouldboard* — The edge of the mouldboard which lies in a vertical plane (*see* Fig. 23).

2.1.3.14 *Standard* (*leg*) — The part connecting the soil cutting unit of the implement to the beam. In a curved beam, the standard is a part of the beam (*see* Fig. 23).

2.1.3.15 *Beam* — A rigid member connecting the plough bottom with power source (*see* Fig. 23).

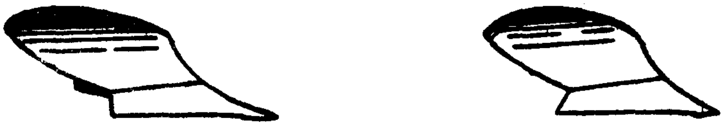
2.1.3.16 *General purpose mouldboard* — A mouldboard having a medium curvature lying between stubble and sod (*see* Fig. 24).

2.1.3.17 *Rod mouldboard* — A mouldboard consisting of rods.

2.1.3.18 *Slat mouldboard* — A mouldboard the surface of which is made of slats placed along the length of the mouldboard (*see* Fig. 24).

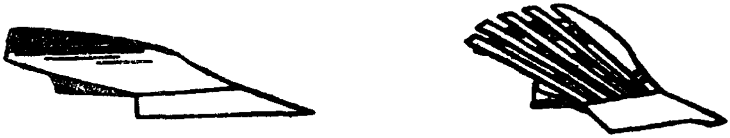
2.1.3.19 *Sod mouldboard or breaker mouldboard* — A long mouldboard with a gentle curvature which lifts and inverts unbroken furrow slice (*see* Fig. 24).

2.1.3.20 *Solid mouldboard* — A mouldboard with unbroken surface.



GENERAL PURPOSE MOULDBOARD

STUBBLE MOULDBOARD



SOD OR BREAKER MOULDBOARD

SLAT MOULDBOARD

FIG. 24

2.1.3.21 *Stubble mouldboard* — A short but broader mouldboard with a relatively abrupt curvature which lifts. breaks and turns the furrow slice used in stubble soils (*see* Fig. 24).

2.1.3.22 *Share* – The parts of the plough bottom which penetrates into the soil and makes a horizontal cut below the surface (*see* Fig. 25).

2.1.3.23 *Cutting edge* – The front edge of the share which makes the horizontal cut in the soil (*see* Fig. 25).

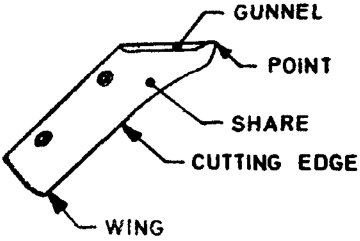


FIG. 25

2.1.3.24 *Gunnel* – The vertical face of the share which rubs against the furrow wall (*see* Fig. 25).

2.1.3.25 *Share point* — The leading end of the cutting edge which facilitates the penetration of a share into the soil (*see* Fig. 25).

2.1.3.26 *Wing of share* — The right or left end of the cutting edge of share in right or left hand ploughs (*see* Fig. 25).

2.1.3.27 *Bar-point share* — A share in which the point of the share is provided by an adjustable and replaceable bar (*see* Fig. 26).

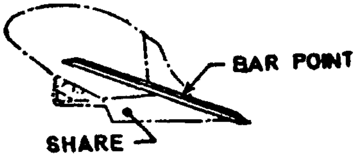


FIG. 26

2.1.3.28 *Shin share* — A share having a shin as an additional part.

2.1.3.29 *Slip-nose share* — A share with detachable point.

2.1.3.30 *Slip share* — A one piece share with curved cutting edge, having no additional part.

2.1.3.31 *Straight share* — A share with straight cutting edge.

2.1.3.32 *Drawbar* — The member that connects a trailed plough to a tractor.

2.1.3.33 *Safety hitch* — A hitch incorporating a device to avoid breakage when a plough works against an abnormal resistance.

2.1.3.34 *Gauge wheel* — An auxiliary wheel of an implement to maintain a uniform depth of working.

2.1.3.35 *Horizontal clevis* — A device to effect lateral adjustment of the plough relative to the line of pull.

2.1.3.36 *Vertical clevis* — A vertical plate, with a number of holes at the end of the beam, to control the depth of operation and adjust line of pull.

2.1.3.37 *Front furrow wheel* — The front wheel of a plough which runs in the furrow (*see* Fig. 27).

2.1.3.38 *Land wheel* — The wheel of a plough which runs on the unploughed land (*see* Fig. 27).

2.1.3.39 *Rear furrow wheel* — The rear wheel of the plough which runs in the furrow (*see* Fig. 27).

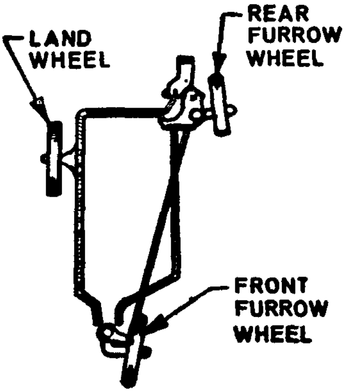


FIG. 27

2.1.3.40 *Coulter* — A device to cut the soil vertically from the land ahead of the plough bottom.

2.1.3.41 *Stationary (knife) coulter* — A stationary blade fixed downward in a vertical position on the beam (*see* Fig. 28).

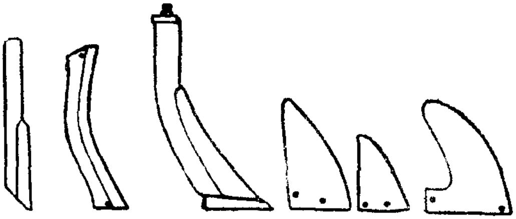


FIG. 28

2.1.3.42 *Disc coulter* — A circular flat or concave revolving steel disc fitted to the beam through a shank and yoke (*see* Fig. 29).

2.1.3.43 *Shank of coulter* — The part that connects the coulter to the plough beam (*see* Fig. 29).

2.1.3.44 *Jointer* — A device which resembles a miniature plough bottom which cuts and turns over a small ribbon-like furrow slice directly ahead of the plough bottom (*see* Fig. 29).

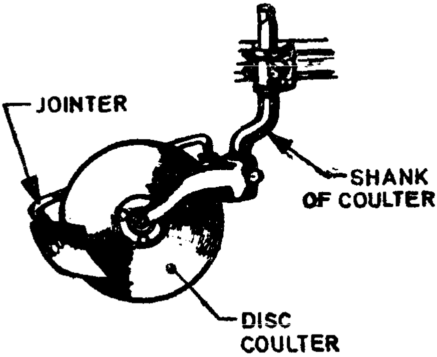


FIG. 29

2.1.3.45 *Levelling control mechanism* — A lever or other mechanism to level a plough transversely.

2.1.3.46 *Levelling control lever* — The lever which operates the levelling control mechanism.

2.1.3.47 *Horizontal clearance* (*side clearance*) — The maximum clearance between land side and a horizontal plane touching point of share at its gunnel side and heel of landside. It is also known as horizontal suction (*see* Fig. 30).

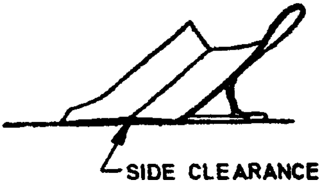


FIG. 30

2.1.3.48 *Vertical clearance* — The maximum clearance under the land side and horizontal surface when the plough is resting on a horizontal surface in the working position. It is also known as vertical suction (*see* Fig. 31).

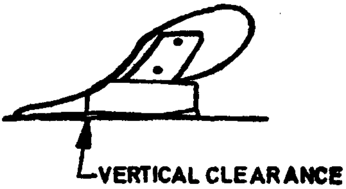


FIG. 31

2.1.3.49 *Throat clearance* — The perpendicular distance between point of share and lower portion of the beam (*see* Fig. 32).

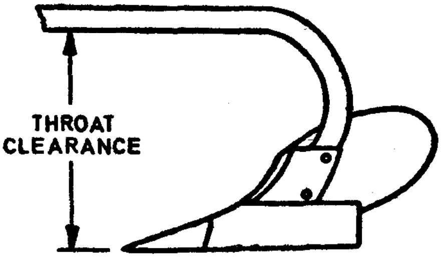


FIG. 32

2.1.3.50 *Centre of power* — The true point of hitch (*see* Fig 33).

2.1.3.51 *Centre of resistance* — The point at which the resultant of all the horizontal and vertical forces act (*see* Fig. 33).

2.1.3.52 *Line of pull* — An imaginary straight line passing from the centre of resistance through the clevis to the centre of pull (*see* Fig. 33).

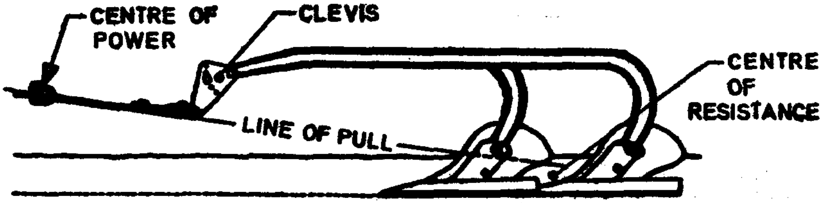


FIG. 33

2.1.4 *Wooden Plough Details*

2.1.4.1 *Body* — The main frame to which shoe, beam and handle are attached.

2.1.4.2 *Share* — A narrow steel bar attached to the upper surface of the shoe longitudinally along the central line and projecting slightly out.

2.1.4.3 *Shoe* — The wedge-shaped lower portion of the plough which moves inside the soil.

2.2 Other Implements

2.2.1 *Bakkhar* — An implement, consisting of one or more blades attached to a beam or frame, used for shallow working of soil with minimum of soil inversion. It is also known as blade harrow.

2.2.2 *Basin Lister* — An implement which makes continuous ridges with furrows in between the ridges.

2.2.3 *Bund Former* — An implement which gathers soil and forms a bund (*see* Fig. 34).

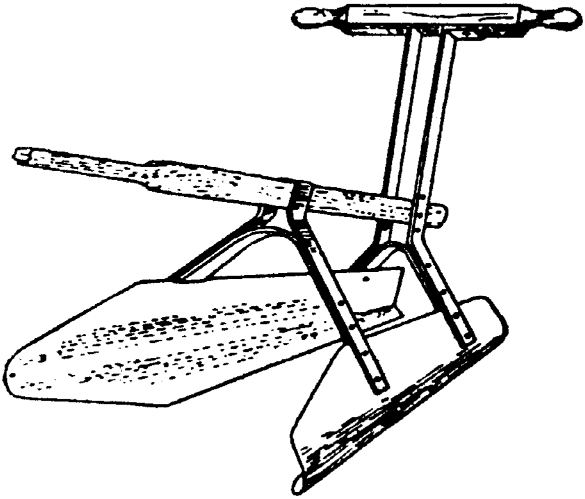


FIG. 34

2.2.4 *Ditcher* — An implement used for making ditches.

2.2.5 *Land Plane* — An implement used for smoothening and planing the soil surface.

2.2.6 *Leveller* — An implement for smoothening the surface of uneven tilled land (*see* Fig. 35).

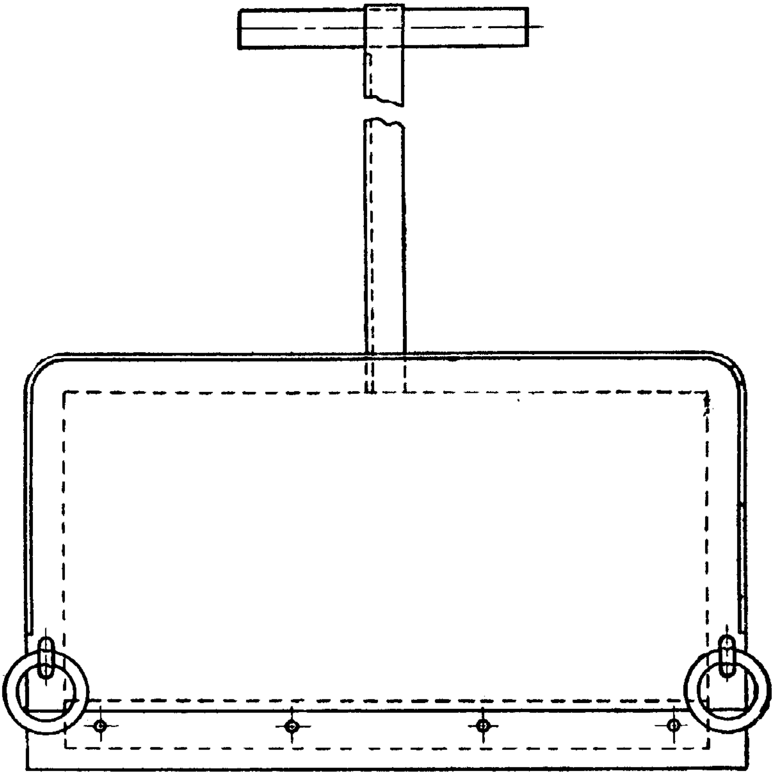


FIG. 35

2.2.7 *Puddler* — An implement used for churning the soil in standing water.

2.2.7.1 *Plank puddler* — A puddler consisting of a wooden plank provided with a number of small spikes on one edge and a handle at the centre of the other edge.

2.2.7.2 *Rotary puddler* — A puddler with blades fixed on a horizontal shaft (*see* Fig 36).

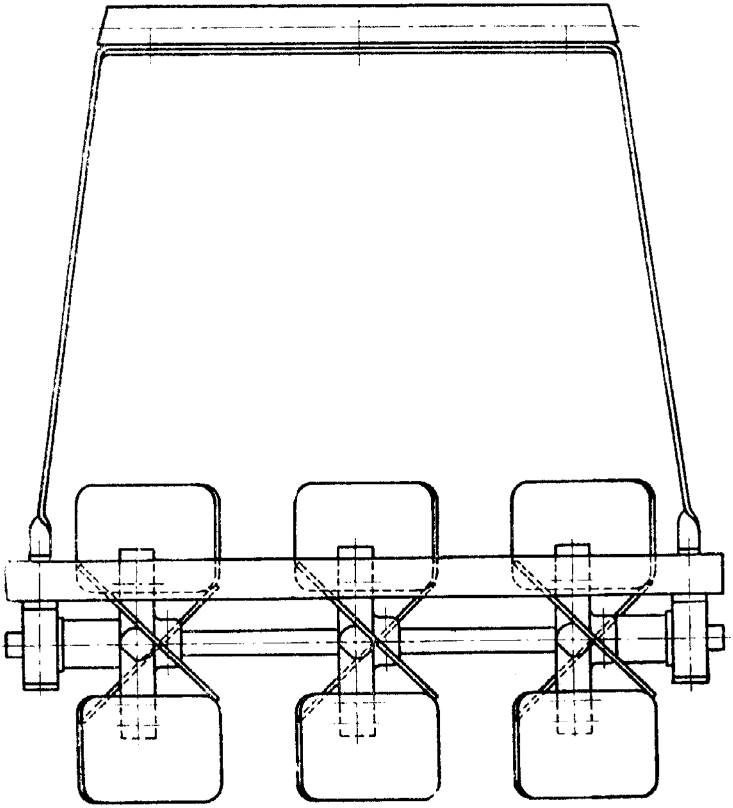


FIG. 36

2.2.8 *Ridger* — An implement which cuts and turns the soil in two opposite directions simultaneously for forming ridges (*see* Fig. 37). It is also known as furrower.

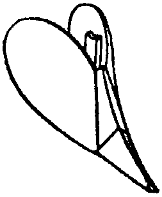


FIG. 37

2.2.9 *Soil Scoop* — An implement used to collect and move soil from one spot to another (*see* Fig. 38).

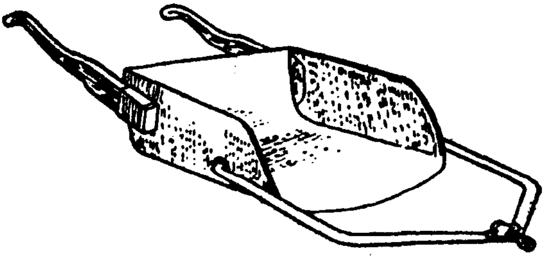


FIG. 38

3. SECONDARY TILLAGE EQUIPMENT

3.1 Float — An implement used for packing down and smoothening the surface of the soil (*see* Fig. 39).

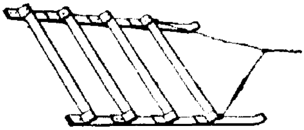


FIG. 39

3.2 Harrow — An implement used to break the clods after ploughing, to collect trash from the ploughed land, to level the seed bed, and to mix the material with the soil.

3.2.1 *Chain Harrow* — A harrow consisting of a frameless network of links (*see* Fig. 40).

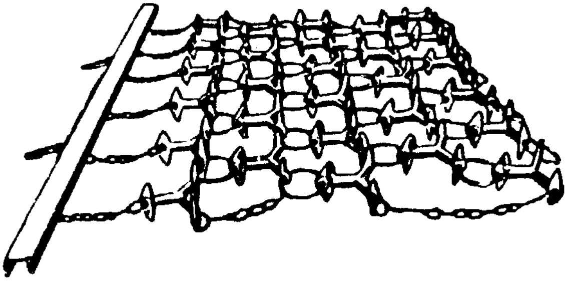


FIG. 40

3.2.2 *Disc Harrow* — A harrow which performs the harrowing operations by means of a set (or a number of sets) of rotating steel discs, each set being mounted on a common shaft.

3.2.2.1 *Double-action disc harrow* — A disc harrow consisting of two or more gangs, in which a set of one or more gangs follows behind the set of the other one or more, arranged in such a way that the front and back gangs throw the soil in opposite directions.

a) *Off-set disc harrow* — A disc harrow with two gangs in tandem, capable of being off set to either side of the centre line of pull (*see* Fig. 41).

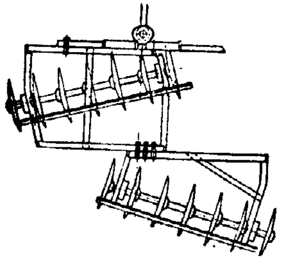


FIG. 41

b) *Tandem disc harrow* — A disc harrow comprising of four gangs with provision of angling in opposite direction (*see* Fig. 42).

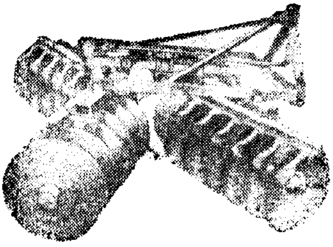


FIG. 42

3.2.2.2 *Single action disc harrow* — A disc harrow with two gangs placed end-to-end displacing the soil outwardly (*see* Fig. 43).

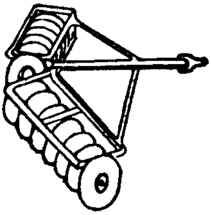


FIG. 43

3.2.2.3 *Disc harrow details*

a) *Angling mechanism* — A mechanism by means of which the gang angles are adjusted.

b) *Disc spacing* — The transverse distance between the edges of two discs separated by a spool.

c) *Gang* — An assembly of concave discs mounted on a common shaft with spools in between.

d) *Gang angle* — The angle between the axis of the gang and the line perpendicular to the direction of travel.

e) *Gang axle* (*arbor axle*) — A shaft on which a set of discs are mounted.

f) *Gang control lever* — A lever which operates the angling mechanism of disc harrow.

g) *Spool* (*spacer*) — The flanged tube mounted on the gang axle between every two discs to retain them at fixed position on the shaft.

3.2.3 *Flexible Tine Harrow* — A harrow consisting of network of spring tines (*see* Fig. 44).

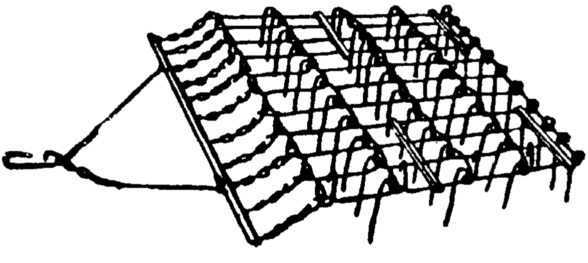


FIG. 44

3.2.4 *Reciprocating Power Harrow* — A harrow fitted with rigid tines driven by the power take-off in a reciprocating transverse or rotary motion as the machine travels forward (*see* Fig. 45).

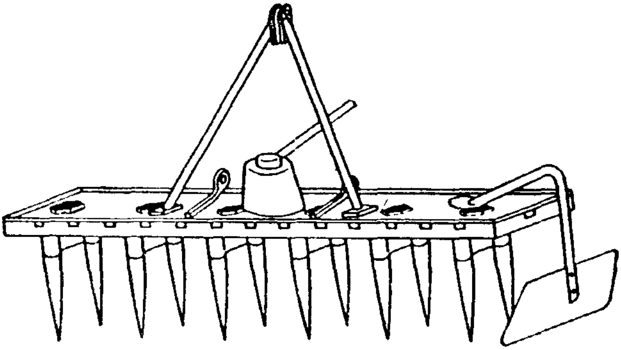


FIG. 45

3.2.5 *Rolling or Rotary Harrow* — A harrow consisting of rigid or flexible tines mounted on one or more horizontal or vertical shafts. It is also known as gyro harrow.

3.2.5.1 *Cage harrow* — A rolling harrow with horizontal shafts each fitted with star-shaped tines joined by rods forming the lines of cylinder (*see* Fig. 46).

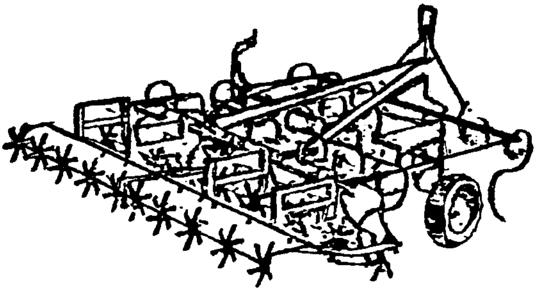


FIG. 46

3.2.5.2 *Circular harrow* — A rolling harrow consisting of a circular frame fitted with teeth and turning about a shaft slightly inclined towards the vertical (*see* Fig. 47).

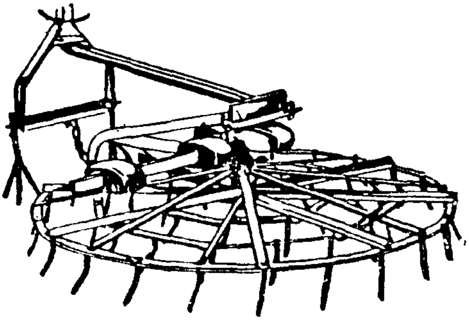


FIG. 47

3.2.5.3 *Clod crusher* — A rolling harrow with horizontal shafts fitted with star shaped tines (*see* Fig. 48).

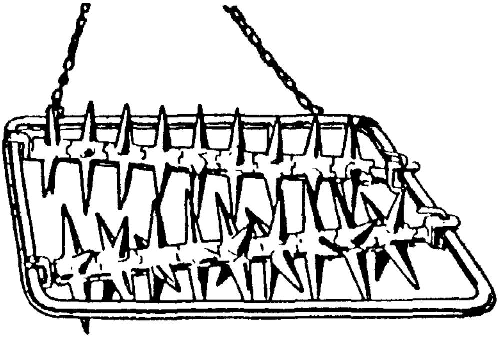


FIG. 48

3.2.5.4 *Roller harrow* — A rolling harrow with a horizontal shaft consisting of a light roller with projecting teeth (*see* Fig. 49).

3.2.6 *Spike-Tooth Harrow* — A harrow with pegs as working part fitted on rigid, articulated or flexible frame (*see* Fig. 50).

3.2.7 *Spring-Tooth Harrow* — A harrow with tough and flexible teeth designed primarily to work in hard and stony soils (*see* Fig. 51).

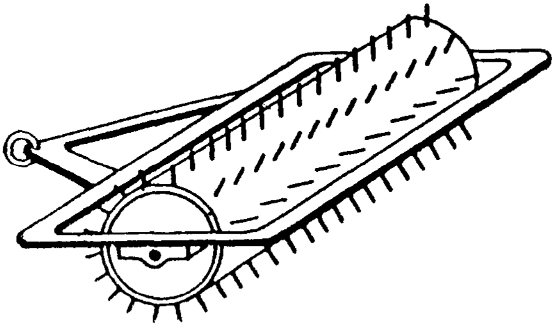


FIG. 49

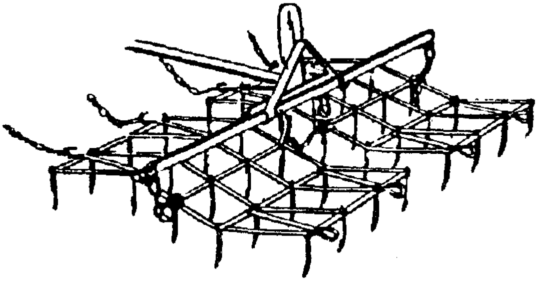


FIG. 50

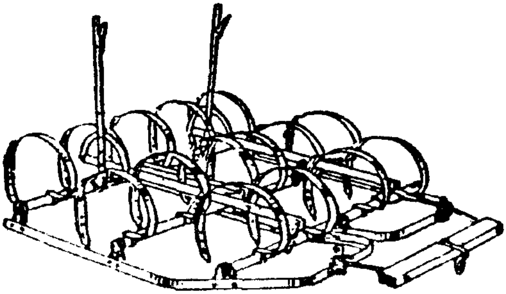


FIG. 51

3.2.8 *Triangular Harrow* — A spike-tooth harrow with a triangular frame (*see* Fig. 52).

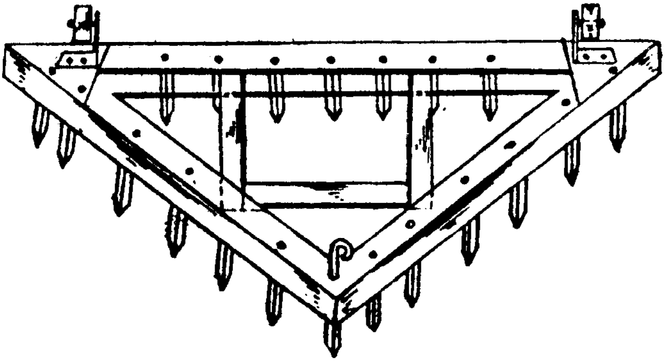


FIG. 52

3.2.9 *Zigzag Harrow* — A spike-tooth harrow with a zigzag frame and teeth attached at the junctions of frame members (*see* Fig. 53).

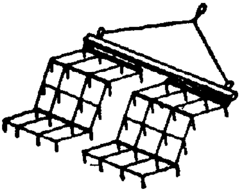


FIG. 53

3.3 Patela — A wooden plank used for smoothening the soil and crushing the clods. In certain cases weeds can be collected with the help of the curved spikes attached behind the wooden board (*see* Fig. 54).

3.4 Roller — An implement with parts mounted on a horizontal shaft used for compacting the soil and crushing the clods.

3.4.1 *Cage Roller* — Roller consisting of a cage of metal bars arranged so as to form the shape of a cylinder (*see* Fig. 55).

3.4.2 *Cambridge Roller* — Roller comprising a number of thick discs, each having the form of two frusta of a cone with a smooth periphery, joined base to base and placed on the same shaft without gap (*see* Fig. 56).

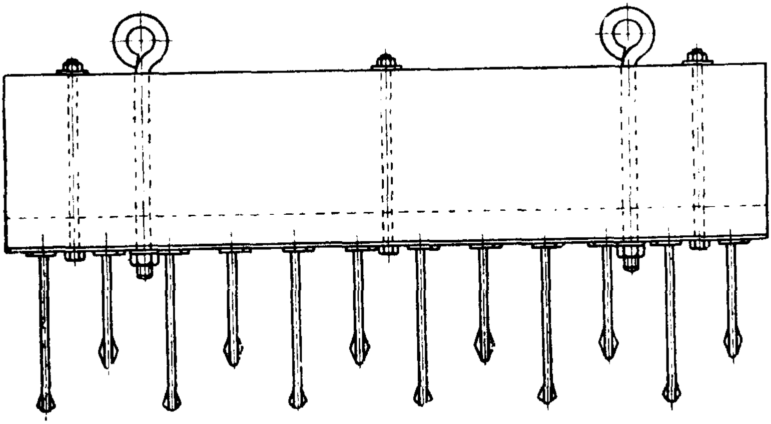


FIG. 54

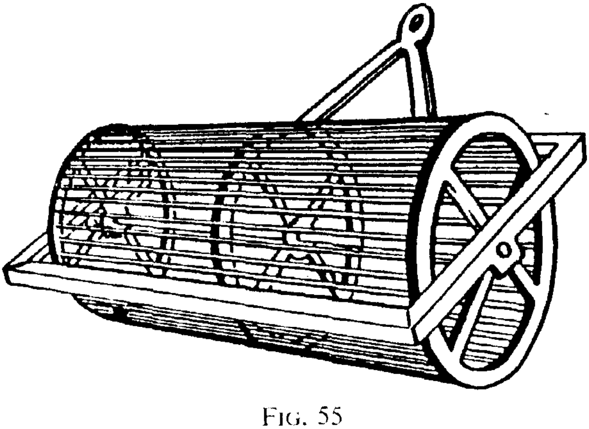


FIG. 55

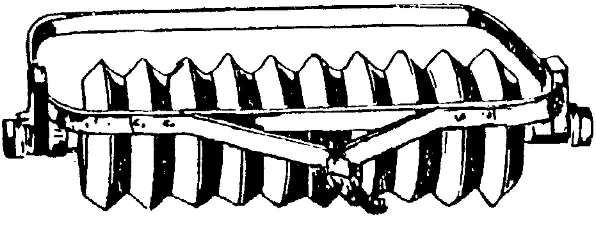


FIG. 56

3.4.3 *Coil Roller* — Roller having the form of a cylindrical cage circumscribed by a spiral (*see* Fig. 57).

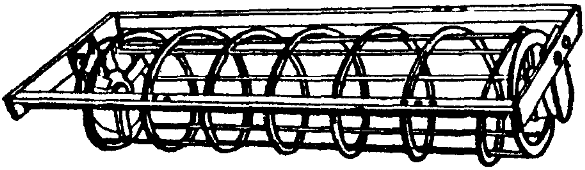


FIG. 57

3.4.4 *Continental Cambridge Roller* — Roller comprising discs of unequal diameters and of alternating smooth and notched surface placed on the same shaft (*see* Fig. 58).

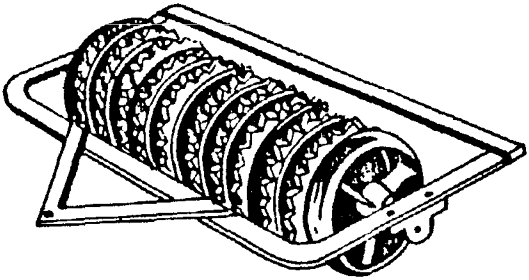


FIG. 58

3.4.5 *Corrugated Roller* — Roller consisting of one or more cylinders of which the surface has corrugations in a concentric form or parallel to the axis of the cylinder (*see* Fig. 59).

3.4.6 *Crosskill Roller* — Roller comprising metallic discs placed on the same shaft. These rough-surfaced discs have unequal projections on their periphery (*see* Fig. 60).

3.4.7 *Flat Roller* — Roller consisting of one or more hollow or solid cylinders with a smooth surface (*see* Fig. 61).

3.4.8 *Furrow Press* — Roller comprising a number of spoked wheels of larger diameter and more widely spaced than those of the spaced ring roller (*see* Fig. 62).

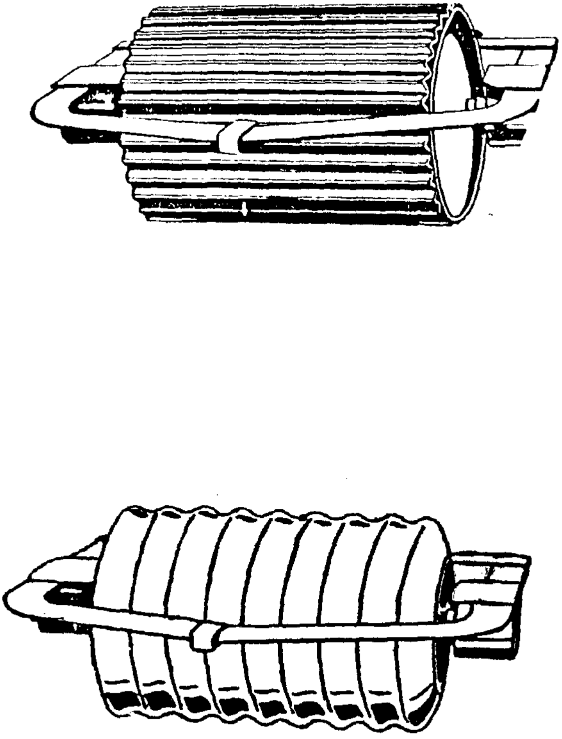


FIG. 59

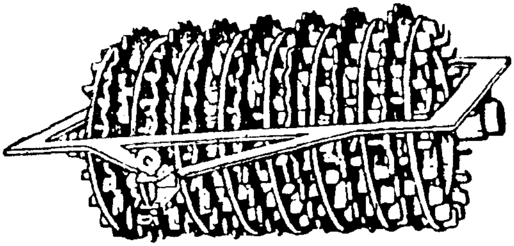


FIG. 60

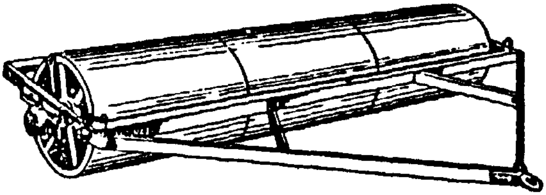


FIG. 61

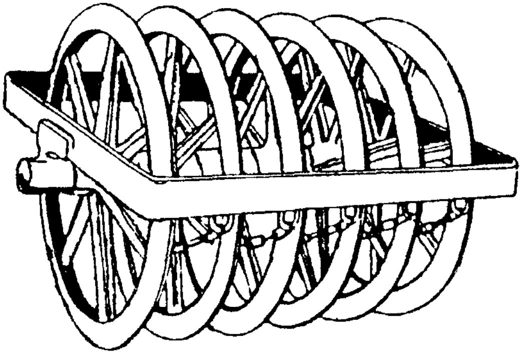


FIG. 62

3.4.9 *Land Packer* (*Culti-Packer*) -- Tandem combination in the same frame either of two cambridge rollers (deep and wide corrugation type) off-set by half a disc or of a cambridge and crosskill rollers (*see* Fig. 63).

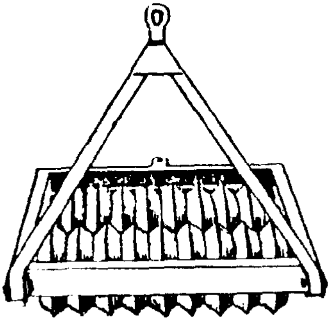


FIG. 63

3.4.10 *Pulverising Roller* — A helically formed roller attached behind a cultivator for breaking the clods (*see* Fig. 64).

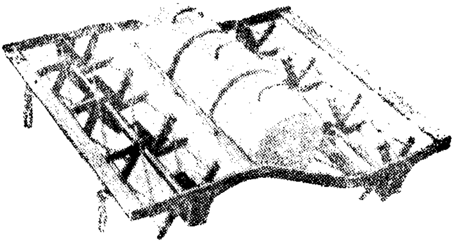


FIG. 64

3.4.11 *Ridge Roller* -- Roller comprising reels, the diameter of each reel decreasing from the outer ends to the centre for use on ridged land so that the surface of the rollers has the same form as the ridges over which they pass.

3.4.12 *Spaced Ring Roller* -- Roller with ring segments tapering at the periphery to a narrow rim spaced at intervals along the shaft. The individual ring segments are smooth, thinner at the periphery than those of the cambridge rollers and sometimes have perforated edges (*see* Fig. 65).

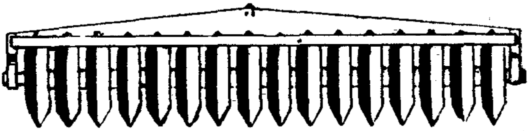


FIG. 65

3.5 Soil Surgeon — An implement consisting of a number of rows of U-shaped knives fixed to the underside of a rectangular board used for breaking clods and uprooting weeds.

3.6 Weeder Mulcher — An implement consisting of flexible tines attached to a frame for mulching breaking the soil crust over germinating seeds and uprooting small weeds (*see* Fig. 66).

4. INTERCULTIVATION IMPLEMENTS

4.1 Cultivator — An implement for inter-cultivation with laterally adjustable tines or discs to work between crop rows. This can be used for seed bed preparation and for sowing with seeding attachment. The tine may have provision for vertical adjustments also.

4.1.1 *Disc Cultivator* — A cultivator fitted with discs.

4.1.2 *Rotary Cultivator* — A cultivator with tines or blades mounted on a power-driven horizontal shaft (*s*) (*see* Fig. 67).

4.1.3 *Tine Cultivator* — A cultivator fitted with tines having shovels (*see* Fig. 68).

4.2 Cultivator Point — A replaceable soil working part attached to the lower end of the cultivator tines, such as shovel and sweep.

4.2.1 *Shovel* — A soil working element with one or both end point. The later is known as reversible shovel.

4.2.2 *Sweep* — A two winged cutting point which cuts the soil in a horizontal direction under the surface.

4.3 Cultivator Tine — A member connecting cultivator point to main frame.

4.3.1 *Rigid Tine* — A cultivator tine which does not deflect during work.

4.3.2 *Spring-Loaded Tine* — A rigid tine hinged to the frame and loaded with one or more springs to enable it to swing on encountering an obstacle.

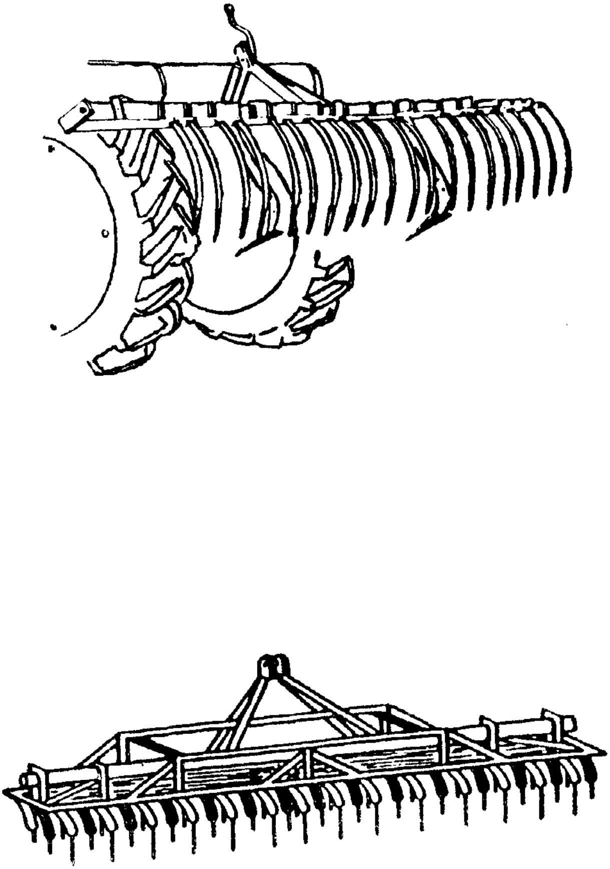


FIG. 66

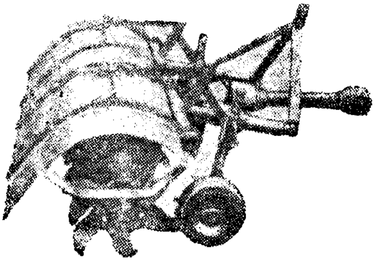


FIG. 67

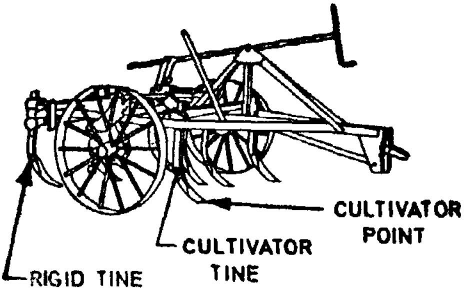


FIG. 68

4.3.3 *Spring Tine* — A cultivator tine made of spring steel which can deflect when an obstacle is encountered in the soil.

4.4 Hoe — A hand tool with blade(s), tine(s) and sometime with disc(s) attached to a frame used for inter-cultivation of row crops.

4.4.1 *Hand-Hoe* — A hand operated hoe (*see* Fig. 69).

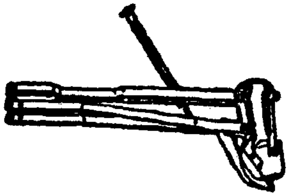


FIG. 69

4.4.2 *Rotary Hoe* — A hoe with curved pointed spikes rigidly attached to horizontal shaft.

4.4.3 *Wheel Hoe* — A hoe with one or two wheels.

4.5 Khurpi — A hand tool comprising a blade and a short handle used for loosening the soil, weeding and earthening up (*see* Fig. 70).

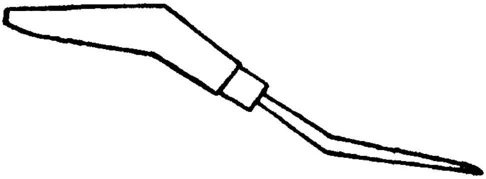


FIG. 70

4.6 Kodali — A hand tool comprising a narrow blade and a wooden handle used for loosening and cutting the soil (*see* Fig. 71).

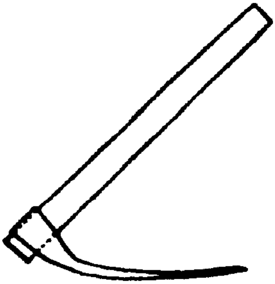


FIG. 71

5. MISCELLANEOUS

5.1 Animal Drawn — Drawn by animals.

5.2 Belt-Driven — Operated by a driving belt and pulley.

5.3 Engine Driven — Operated by an engine.

5.4 Ground Wheel Driven — Operated by a wheel in contact with the ground.

5.5 Hand Operated — Operated by hand.

5.6 Implement — Equipment generally having no driven moving parts, such as harrow or having only simple mechanisms such as plough.

5.7 Machine — A combination of rigid or resistant bodies having definite motions and capable of performing useful work.

5.8 Manually-Operated — Operated by human being.

5.9 Mounted — Attached to a tractor so as to form a single unit, and to be completely carried on the tractor when out of operation.

5.10 Power Lift — Raised or lowered by engine power.

5.11 Power Operated — Operated by a prime mover, such as engine, tractor, power tiller and electric motor.

5.12 PTO Driven — Operated by power take-off of a tractor.

5.13 Self Lift — Raised or lowered by drive from a ground wheel or wheels.

5.14 Self-Propelled — Propelled and operated by a power unit or units integral with the machine.

5.15 Semi-Mounted — Partly carried on a tractor both when in and out of operation.

5.16 Steerage — Allowing limited lateral movement under manual control independent of the tractor.

5.17 Tool — An individual working element.

5.18 Tractor Operated — Operated by a tractor.

5.19 Trailed — Drawn by a tractor but not carried on by it.